

REMARKS

Claims 1, 23-25 and 28-50 have been rejected as anticipated by U.S. Patent No. 1,459,326 (Dow patent). Claims 1, 23, 25, 28 and 31-50 have been rejected as reciting subject matter anticipated by U.S. Patent No. 6,395,175 (Gao patent). Claims 26 and 27 have been rejected as reciting subject matter obvious over the disclosure contained in the Dow patent; in addition, the Examiner contends that a recitation of selecting relative dimensions is obvious.

The Examiner has further stated that the previous rejections were overcome with the earlier filed Response and that the present rejection is based upon new grounds. Before addressing these new grounds for rejection, it may be well to summarize the subject matter of the present invention along with its operation and unexpected results achieved. Furthermore, it may be noted that independent Claims 1, 31 and 32 have been amended to more particularly point out and distinctly claim the invention.

The flow homogenizer recited in Claims 1, 31 and 32 is for insertion in a pipeline conveying a particulate material CARRIED by a carrier fluid. Such combination exhibits particular flow characteristics which impact on the manner in which mixing may be achieved.

The flow homogenizer requires that each pair of upstream and downstream pipe sections defines an upstream inlet and a downstream outlet and that each of the upstream inlet and the downstream outlet have FIXED cross sectional areas. Fixing the cross sectional areas of the upstream inlet and the downstream outlet ensures that the flow homogenizer accurately and repeatably breaks up ropes of entrained particles and provides consistent mixing results, while maintaining any pressure drop across the homogenizer at a constant level. In addition, the upstream and downstream pipe sections in each pair define DIFFERENT relatively gradual or relatively rapid changes in cross sectional area in order to mix the particulate material with the carrier fluid.

The inclusion of upstream and downstream pipe sections in each pair having different relatively gradual or relatively rapid changes in cross sectional area allows the tuning of one pipe section to break up ropes entrained material and the tuning of the other pipe section to provide consistent mixing. Moreover, the inclusion of such pipe sections allows the tailoring of the homogenizer according to the nature and properties of the particulate material and the carrier fluid. These structural features which afford the benefits achieved by the present invention are now carefully recited in independent Claims 1, 31 and 32.

The actual structure and operation of the apparatus disclosed in each of the Dow and Gao patents will be reviewed below.

Dow patent - in the drier disclosed in the Dow patent, material (5) falls under gravity from a hopper (25) through a series of chambers (1, 8, 9), into a collecting chamber (10). A suction apparatus (2) draws hot air through the chambers (1, 8, 9) in an opposite direction to the flow of material (5).

It follows that the drier recited in the Dow patent is not a flow homogenizer as specified in Claims 1, 31 and 32 because at no time is the material (5) CARRIED by the hot air, i.e. a carrier fluid. Moreover, even if the Examiner asserts that the apparatus disclosed in the Dow patent is a flow homogenizer, the structure of the flow homogenizer of the present invention (as recited in Claims 1, 31 and 32) differs from the apparatus disclosed in the Dow patent in any event.

In particular, each chamber (1, 8, 9) disclosed in Dow patent includes a gate (15) at the lower, downstream (in terms of material (5) flow) outlet end. Each gate (15) includes a pair of side walls which are movable relative to the upper inlet end of an adjacent chamber (8,9) to selectively open (as shown in relation to chamber 1) or throttle (as shown in relation to chambers 8 and 9) the flow of material (5). As a result, each of the inlet and outlet ends of each chamber (1, 8, 9) have a variable cross sectional area. If one skilled in the art were to attempt to utilize the apparatus taught in the Dow patent as a flow homogenizer then he/she would have a great deal of difficulty maintaining consistent and repeatable material rope break up and mixing. In addition, one skilled in the art would know that fixing the cross sectional area of the inlet and outlet ends

of each chamber (1, 8, 9) would render the Dow apparatus inoperative for its intended purposes. This results because fixing a minimum cross sectional area in order to retain material (5) while the hot air dries it, as shown in chambers 8 and 9, would prevent a ready fall of material (5) from one chamber to another while fixing a maximum cross sectional area will allow material (5) to fall from one chamber to another, as shown in chamber 1, too quickly for any effective drying to take place. It follows, therefore, that one skilled in the art would not modify the apparatus disclosed in the Dow patent to fix the cross sectional area of the inlet and outlet ends of each chamber (1, 8, 9).

Gao patent - The Gao patent discloses, in Figures 2 and 2A, a prior art pulsing spilling self-aerator (PSSA) which is configured to entrain a first gas or other fuel (12) with a freely falling second fluid (10). It follows that Figures 2 and 2A as shown in the Gao patent, together with the accompanying descriptive text, is unconcerned with conveying particulate matter by a carrier fluid. Consequently, the PSSA described in the Gao patent is not a flow homogenizer as recited in Claims 1, 31 and 32 because at no time is any particulate material conveyed within the PSSA.

Nevertheless, if the Examiner continues to assert that the apparatus disclosed in the Gao patent is a flow homogenizer, then it is respectfully submitted that the flow homogenizer recited in Claims 1, 31 and 32 differs from the apparatus disclosed in the Gao patent anyway. In this regard, the PSSA includes a pulser connection tube (108) which has a plurality of adjacent

defuser (110) and reducer (112) pairs. The rate of change in cross sectional area of each defuser (110) is the same as the rate of change in cross sectional area of each reducer (112). The impact of such configuration, in relation to the carrying of a particulate material by a carrier fluid, is that the diffusers (110) would provide sub optimal breakup of ropes of material, and/or the reducers (112) would provide sub optimal mixing. It therefore becomes self evident that the apparatus (PSSA arrangement) disclosed in the Gao patent is very different from that recited in Claims 1, 31 and 32. Moreover, the Gao apparatus is incapable of providing performance tailoring according to the nature of the particulate material and the carrier fluid.

In conclusion, neither the Dow patent nor the Gao patent teach diffusers of the structure as set forth in Claims 1, 31 and 32 nor is the operation recited in this claim capable of being performed by the apparatus disclosed in either of these patents. Accordingly, allowance of Claims 1, 31 and 32 is respectfully requested. As all of the remaining claims depend directly or indirectly from one of Claims 1, 31 or 32, allowance of these dependent claims is also requested.

In consideration of the amendments to Claims 1, 31 and 32 to more particularly point out and distinctly claim the invention, the dependency of the remaining claims from one of Claims 1,

31 or 32 and the discussion of the structure and operation disclosed in each of the two applied patents, it is believed that the application is in condition for allowance, which allowance is respectfully requested.

Respectfully submitted,

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